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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/599,813

07/17/2007

Anand Chellappa

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86451

7590

06/23/2011

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EXAMINER

HANDAL, KAITY V

ART UNIT

PAPER NUMBER

1723

MAIL DATE

DELIVERY MODE

06/23/2011

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/599,813	<b>Applicant(s)</b> CHELLAPPA, ANAND	
	<b>Examiner</b> KAITY HANDAL	<b>Art Unit</b> 1723	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2011.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15, 17 and 19-35 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 and 29-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15, 17, 19-28 and 32-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/28/2011 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 15, 17, 24-28, 32-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Wieland et al. (US 7,150,866).

With respect to claims 15 and 32, Wieland teaches an apparatus comprising: a single hydrogen reactor chamber (Fig. 1) (Abstract) in which is disposed a plurality of steam reformation catalysts disposed therein (3 & 4) (as illustrated) to form a staged

Art Unit: 1723

configuration (as illustrated), the staged configuration comprising a series of distinct zones or portions (as illustrated), each zone or portion in physical contact with at least one other zone or portion (as illustrated) and each zone or portion containing at least one of the plurality of steam reformation catalysts; and wherein said plurality of steam reformation catalysts includes a high-activity steam reformation catalyst (4), a coke-resistant steam reformation catalyst (3) and a steam reformation catalyst which promotes a water-gas shift reaction (Page 3, para. [0038], [0039], [0044], [0047]) (as illustrated).

With respect to claim 17, Wieland teaches wherein the coke-resistant steam reformation catalyst (3) is loaded at an entrance of said hydrogen reactor chamber (as illustrated).

With respect to claim 24, Wieland teaches wherein said coke-resistant steam reformation catalyst (3) is loaded at an entrance of said steam reformer, followed by said high-activity steam reformation catalyst (4) (as illustrated).

With respect to claim 25, Wieland teaches wherein the high activity steam reformation catalyst comprising at least one noble metal component (page 4, para. [0050]).

With respect to claims 26-27, Wieland teaches wherein the plurality of catalysts are coatings supported on a substrate comprising monolith honeycomb bodies (page 3, para. [0035]).

With respect to claim 28, Wieland teaches wherein a fuel cell is in fluid communication with the hydrogen generation reactor (page 1, para. [0008]).

With respect to claim 33, Wieland teaches wherein the end of each zone or portion is in contact with another zone or portion is an abrupt end (as illustrated).

4. Claims 15, 17, 19-20, 24-28 and 32-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Wieland et al. (US 2004/0063577).

With respect to claims 15 and 32, Wieland teaches an apparatus comprising: a single hydrogen reactor chamber (Fig. 2) (Abstract) in which is disposed a plurality of steam reformation catalysts disposed therein (3 & 4 & 5) (as illustrated) to form a staged configuration (as illustrated), the staged configuration comprising a series of distinct zones or portions (as illustrated), each zone or portion in physical contact with at least one other zone or portion (as illustrated) and each zone or portion containing at least one of the plurality of steam reformation catalysts; and wherein said plurality of steam reformation catalysts includes a high-activity steam reformation catalyst (4), a coke-resistant steam reformation catalyst (3) and a steam reformation catalyst which promotes a water-gas shift reaction (5) (col. 4, lines 52-65) (as illustrated).

With respect to claim 17, Wieland teaches wherein the coke-resistant steam reformation catalyst (3) is loaded at an entrance of said hydrogen reactor chamber (col. 6, lines 18-20) (as illustrated).

With respect to claims 19-20, Wieland teaches wherein said high-activity steam reformation catalyst (4) and said coke-resistant steam reformation catalyst (3) are supported/doped nickel-based catalysts/(transition metal oxides) (col. 5, lines 34-42).

With respect to claim 24, Wieland teaches wherein said coke-resistant steam reformation catalyst (3) is loaded at an entrance of said steam reformer, followed by said high-activity steam reformation catalyst (4) (as illustrated).

With respect to claim 25, Wieland teaches wherein the high activity steam reformation catalyst comprising at least one noble metal component (col. 6, lines 35-41).

With respect to claims 26-27, Wieland teaches wherein the plurality of catalysts are coatings supported on a substrate comprising monolith honeycomb bodies (col. 4, lines 3-11).

With respect to claim 28, Wieland teaches wherein a fuel cell is in fluid communication with the hydrogen generation reactor (col. 1, lines 5-15).

With respect to claim 33, Wieland teaches wherein the end of each zone or portion is in contact with another zone or portion is an abrupt end (as illustrated).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 21-23 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wieland (US 7,150,866) as applied to claim 15 and 20 above.

With respect to claims 21-23, Wieland discloses all claim limitations as set forth above, including wherein the platinum group metal is supported on at least one oxide selected from oxides of alkaline earth metals and oxides of transition elements and oxides of rare earth metals (col. 5, lines 25-41), therefore, it would be obvious if not inherent that the reforming catalyst taught by Wieland would be a platinum group metal supported by nickel oxide and potassium oxide, for example, as one of the choices taught by Wieland; which catalyst would be obvious to one having ordinary skill in the art at the time of the invention to choose to make based on Wieland's teaching.

7. Claims 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wieland et al. (US 2004/0063577) as applied to claim 32 above, and further in view of Hwang et al. (US 6,436,363).

With respect to claims 34-35, Wieland teaches providing a graded catalyst arrangement (col. 6, lines 9-21), but fails to explicitly teach wherein the end of each zone or portion is in contact with another zone or portion is characterized by a decreasing gradient of one or more catalysts and an increasing gradient of another. However, it is well known in the art that a graded catalyst comprising a catalytic partial oxidation and a steam reforming catalyst combination can be applied such that the graded catalyst layers comprises a decreasing gradient of one or more catalysts and an increasing gradient of another as evidenced in Hwang et al. (see Fig. 3) (col. 7, lines 41-64). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have the graded catalyst layers of Wieland comprise a

Art Unit: 1723

decreasing gradient of one or more catalysts and an increasing gradient of another since it is well known in the art to do so as evidenced by Wieland.

8. Claims 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wieland et al. (US 2004/0063577) as applied to claim 32 above, and further in view of Hwang et al. (US 6,436,363).

With respect to claims 34-35, Wieland teaches providing a graded catalyst arrangement (col. 6, lines 9-21), but fails to explicitly teach wherein the end of each zone or portion is in contact with another zone or portion is characterized by a decreasing gradient of one or more catalysts and an increasing gradient of another. However, it is well known in the art that a graded catalyst comprising a catalytic partial oxidation and a steam reforming catalyst combination can be applied such that the graded catalyst layers comprises a decreasing gradient of one or more catalysts and an increasing gradient of another as evidenced in Hwang et al. (see Fig. 3) (col. 7, lines 41-64). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have the graded catalyst layers of Wieland comprise a decreasing gradient of one or more catalysts and an increasing gradient of another since it is well known in the art to do so as evidenced by Wieland.

### ***Response to Arguments***

9. Specification: Objection made to the Abstract is withdrawn by the Examiner due to Applicant's amendment made thereto.



Art Unit: 1723

10. Prior Art Rejection: Applicant's arguments filed 3/28/2011 have been fully considered but they are moot. New grounds of rejection is set forth above due to Applicant's amendment made to the claims.

### ***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAITY V. HANDAL whose telephone number is (571)272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Neckel Alexa can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KAITY V. HANDAL/  
Primary Examiner, Art Unit 1723

6/17/2011

Application/Control Number: 10/599,813  
Art Unit: 1723

Page 9